

# FCC Test Report

Equipment	:	Wireless AC1000 Dual Band Cloud Router
Brand Name	:	D-Link
Model No.	:	DIR-820L
FCC ID	:	KA2IR820LB1
Standard	:	47 CFR FCC Part 15.407
<b>Operating Band</b>	:	5150 MHz – 5250 MHz
FCC Classification	:	NII
Applicant	:	D-Link Corporation 17595 Mt. Herrmann, Fountain Valley, CA 92708 U.S.A.

The product sample received on Mar. 10, 2014 and completely tested on Mar. 28, 2014. We, SPORTON, would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.10-2009 and shown compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.

Reviewed by:

James Fan / Assistant Manager





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## Summary of Test Result

Conformance Test Specifications							
Report Clause	Ref. Std. Clause	Description	Measured	Limit	Result		
1.1.2	15.203	Antenna Requirement	Antenna connector mechanism complied	FCC 15.203	Complied		
3.1	15.207	AC Power-line Conducted Emissions	[dBuV]: 28.684MHz 49.20 (Margin 10.80dB) - QP 45.51 (Margin 4.49dB) - AV	FCC 15.207	Complied		
3.2	15.407(a)	Emission Bandwidth	Bandwidth [MHz] 20M:21.91 / 40M:44.52 80M:83.48	Information only	Complied		
3.3	15.407(a)	RF Output Power (Maximum Conducted (Average) Output Power)	Power [dBm] 5150-5250MHz:16.87	Power [dBm] 5150-5250MHz:17	Complied		
3.4	15.407(a)	Peak Power Spectral Density	PPSD [dBm/MHz] 5150-5250MHz:3.75	PPSD [dBm/MHz] 5150-5250MHz:4	Complied		
3.5	15.407(a)	Peak Excursion	8.52 dB	13 dB	Complied		
3.6	15.407(b)	Transmitter Unwanted Emissions and Band Edge	Restricted Bands [dBuV/m at 3m]: 5150.00MHz 52.58 (Margin 1.42dB) – AV	Non-Restricted Bands: ≤ -27dBm (68.3dBuV/m@3m) Restricted Bands: FCC 15.209	Complied		
3.7	15.407(g)	Frequency Stability	3.5942 ppm	Signal shall remain in-band	Complied		





## **Revision History**

Report No.	Version	Description	Issued Date
FR430734AN	Rev. 01	Initial issue of report	Apr. 14, 2014



## **1** General Description

#### 1.1 Information

#### 1.1.1 RF General Information

RF General Information						
Frequency Range (MHz)	IEEE Std. 802.11	Ch. Freq. (MHz)	Channel Number	Transmit Chains (Ν <sub>τx</sub> )	RF Output Power (dBm)	Co-location
5150-5250	а	5180-5240	36-48 [4]	2	16.78	Yes
5150-5250	n(HT20)	5180-5240	36-48 [4]	2	16.71	Yes
5150-5250	n(HT40)	5190-5230	38-46 [2]	2	16.84	Yes
5150-5250	ac(VHT20)	5180-5240	36-48 [4]	2	16.77	Yes
5150-5250	ac(VHT40)	5190-5230	38-46 [2]	2	16.87	Yes
5150-5250	ac(VHT80)	5210	42 [1]	2	16.09	Yes
						103

Note 1: RF output power specifies that Maximum Conducted (Average) Output Power.

Note 2: 802.11a/n uses a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM modulation.

Note 3: 802.11ac uses a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM, 256QAM modulation.

Note 4: Co-location, Co-location is generally defined as simultaneously transmitting (co-transmitting) antennas within 20 cm of each other. (i.e., EUT has simultaneously co-transmitting that operating 2.4GHz and 5GHz.)

#### 1.1.2 Antenna Information

	Antenna Category					
	Equipment placed on the market without antennas					
$\bowtie$	Inte	gral antenna (antenna permanently attached)				
	$\boxtimes$	Temporary RF connector provided				
		No temporary RF connector provided Transmit chains bypass antenna and soldered temporary RF connector provided for connected measurement. In case of conducted measurements the transmitter shall be connected to the measuring equipment via a suitable attenuator and correct for all losses in the RF path.				
	Exte	ernal antenna (dedicated antennas)				
		Single power level with corresponding antenna(s).				
		Multiple power level and corresponding antenna(s).				
	RF connector provided					
	Unique antenna connector. (e.g., MMCX, U.FL, IPX, and RP-SMA, RP-N type)					
		Standard antenna connector. (e.g., SMA, N, BNC, and TNC type)				



	Antenna General Information						
No.	No. Ant. Cat. Ant. Type Connector Gain (dBi)						
1	Integral	PCB	I-PEX	0			
2	Integral	PCB	I-PEX	0			

#### 1.1.3 Type of EUT

	Identify EUT				
EUT	Γ Serial Number	N/A			
Pre	sentation of Equipment	Production ;  Pre-Production ;  Prototype			
		Type of EUT			
$\boxtimes$	Stand-alone				
	Combined (EUT where the radio part is fully integrated within another device)				
	Combined Equipment - Brand Name / Model No.:				
	Plug-in radio (EUT intended for a variety of host systems)				
	Host System - Brand Name / Model No.:				
	Other:				

#### 1.1.4 Test Signal Duty Cycle

Operated Mode for Worst Duty Cycle					
Operated normally mode for worst duty cycle	Operated normally mode for worst duty cycle				
Operated test mode for worst duty cycle					
Test Signal Duty Cycle (x)Power Duty Factor [dB] - (10 log 1/x)					
⊠ 94.20% - IEEE 802.11a	0.26				
91.87% - IEEE 802.11ac (VHT20)	0.37				
80.20% - IEEE 802.11ac (VHT40)	0.96				
☑ 65.30% - IEEE 802.11ac (VHT80)	1.85				

#### 1.1.5 EUT Operational Condition

Supply Voltage	AC mains	DC	
Type of DC Source	Internal DC supply	External DC adapter	Battery



## **1.2** Accessories and Support Equipment

	Accessories							
No.	Equipment	Brand Name	Model Name	Spec.				
1	Adapter 1	D-Link	AMS9-1201000FU2	I/P: 100-240Vac, 50-60Hz, 0.5A, O/P: 12Vdc, 1.0A 1.22m non-shielded without core.				
2	Adapter 2	D-Link	F12W-120100SPAU	I/P: 100-240Vac, 50-60Hz, 0.3A, O/P: 12Vdc, 1.0A 1.23m non-shielded without core.				
3	Adapter 3	D-Link	F12W3-120100SPAU	I/P: 100-240Vac, 50-60Hz, 0.3A, O/P: 12Vdc, 1.0A 1.20m non-shielded without core.				

	Support Equipment						
No.	No. Equipment Brand Name Model Name FCC ID						
1	Notebook	DELL	E6430	DoC			
2	Notebook	DELL	E6410	DoC			
3	USB Dongle	Transcend	4G				

### **1.3 Testing Applied Standards**

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- 47 CFR FCC Part 15
- ANSI C63.10-2009
- FCC KDB 789033 v01r03
- FCC KDB 662911 v02r01
- FCC KDB 412172 v01

### **1.4 Testing Location Information**

	Testing Location									
$\boxtimes$	HWA YA	ADD : No. 52, Hwa Ya 1 <sup>st</sup> Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.								
	TEL : 886-3-327-3456 FAX : 886-3-327-0973									
Т	est Conditio	on	Т	est Site No.	Test Engineer	Test Environment	Test Date			
R	F Conducte	d		TH01-HY	Mark Liao	21°C / 64%	Mar. 28, 2014			
AC Conduction CO04-HY				CO04-HY	Skys Huang	20°C / 67%	Mar. 27, 2014			
Rad	Radiated Emission         03CH08-HY         Jack Li         18-20°C / 66-68%         Mar. 10 ~ Mar. 24, 2014									
				r [636805] with F r [4086B-2] with						



## 1.5 Measurement Uncertainty

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2)

Measurement Uncertainty								
Test Item		Uncertainty	Limit					
AC power-line conducted emissions	±2.26 dB	N/A						
Emission bandwidth		±1.42 %	N/A					
RF output power, conducted		±0.63 dB	N/A					
Power density, conducted	±0.81 dB	N/A						
All emissions, radiated	30 – 1000 MHz	±3.9 dB	N/A					
	Above 1GHz	±4.2 dB	N/A					
Temperature		±0.8 °C	N/A					
Humidity		±3 %	N/A					
DC and low frequency voltages		±3 %	N/A					
Time		±1.42 %	N/A					
Duty Cycle		±1.42 %	N/A					



## 2 Test Configuration of EUT

## 2.1 The Worst Case Modulation Configuration

Worst	Worst Modulation Used for Conformance Testing (5150-5250MHz)									
Modulation Mode Transmit Chains (N <sub>TX</sub> ) Data Rate / MCS Worst Data Rate / M										
11a	2	6-54Mbps	6 Mbps							
HT20	2	M0-15	MO							
HT40	2	M0-15	MO							
VHT20	2	M0-8	MO							
VHT40	2	M0-9	MO							
VHT80	2	M0-9	MO							

### 2.2 The Worst Case Power Setting Parameter

The Worst Case Power Setting Parameter (5150-5250MHz band)									
Test Software MTool									
Test Software Version	RTL8	19x 2.3							
				Test	Frequency	(MHz)			
Modulation Mode	Ντχ	1	NCB: 20MH	z	NCB:	40MHz	NCB: 80MHz		
		5180	5200	5240	5190	5230	5210		
11a,6-54Mbps	2	39/38	37/36	36/35					
HT20,M0-15	2	39/38	38/37	37/36					
HT40,M0-15	2				40/39	39/37			
VHT20,M0-8	2	39/38	38/37	37/36					
VHT40,M0-9	2				40/39	39/37			
VHT80,M0-9	2						38/36		



## 2.3 The Worst Case Measurement Configuration

The Worst Case Mode for Following Conformance Tests						
Tests Item         AC power-line conducted emissions						
Condition         AC power-line conducted measurement for line and neutral Test Voltage: 120Vac / 60Hz						
Operating Mode Operating Mode Description						
1 AC Power & Radio link (WLAN), Adapter 1						
Note: Adapter 1, Adapter	2, and Adapter 3 had been pretested and found that the <b>Adapter 1</b> was the worst					

case and was selected for final test.

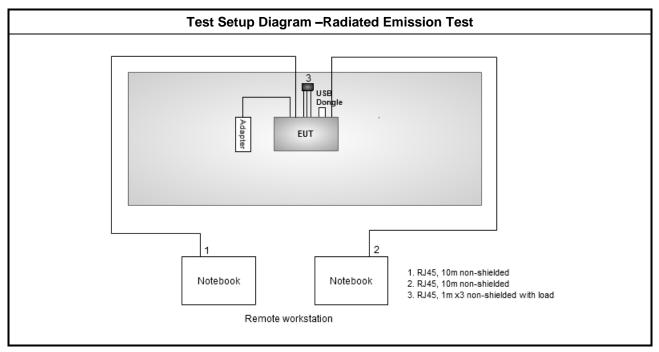
The Worst Case Mode for Following Conformance Tests							
Tests Item RF Output Power							
Test Condition	Conducted measurement at transmit chains						
Modulation Mode 11a, HT20, HT40, VHT20, VHT40, VHT80							
Operating Mode	Operating Mode Description						
1	AC Power & Radio link (WLAN), Adapter 1						

The Worst Case Mode for Following Conformance Tests						
Tests Item         Peak Power Spectral Density, Peak Excursion, Emission Bandwidth						
Test Condition         Conducted measurement at transmit chains						
Modulation Mode 11a, VHT20, VHT40, VHT80						
Operating Mode	Operating Mode Description					
1	AC Power & Radio link (WLAN), Adapter 1					



Th	The Worst Case Mode for Following Conformance Tests								
Tests Item	Transmitter Radiated Unwanted Emissions Transmitter Radiated Bandedge Emissions								
Test Condition	Radiated measurement If EUT consist of multiple antenna assembly (multiple antenna are used in EUT regardless of spatial multiplexing MIMO configuration), the radiated test should be performed with highest antenna gain of each antenna type.								
	EUT will be placed in	fixed position.							
User Position		mobile position and operati o orthogonal planes. The w							
		eld or body-worn battery-po sitions. EUT shall be perforr e worst planes is X.							
Operating Mode	🛛 1. AC Power & Radi	o link (WLAN), Adapter 1							
Modulation Mode	11a, VHT20, VHT40, VHT8	30							
	X Plane	Y Plane	Z Plane						
Orthogonal Planes of EUT	of Carteria								
Note: Adapter 1, Adapter 2 case and was selected for	2, and Adapter 3 had been p final test.	retested and found that the	Adapter 1 was the worst						

## 2.4 Test Setup Diagram





#### **Transmitter Test Result** 3

#### 3.1 **AC Power-line Conducted Emissions**

#### 3.1.1 **AC Power-line Conducted Emissions Limit**

AC Power-line Conducted Emissions Limit						
Frequency Emission (MHz)         Quasi-Peak         Average						
0.15-0.5	66 - 56 *	56 - 46 *				
0.5-5	56	46				
5-30 60 50						
Note 1: * Decreases with the logarithm c	of the frequency	1				

ecreases with the logarithm of the frequency

#### 3.1.2 Measuring Instruments

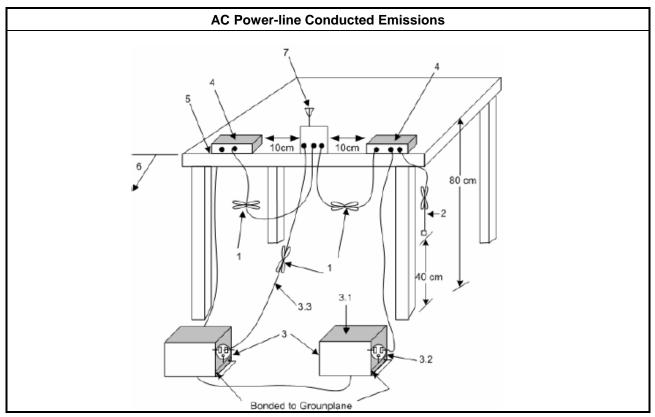
Refer a test equipment and calibration data table in this test report.

#### 3.1.3 **Test Procedures**

**Test Method** 

Refer as ANSI C63.10-2009, clause 6.2 for AC power-line conducted emissions.

#### 3.1.4 Test Setup

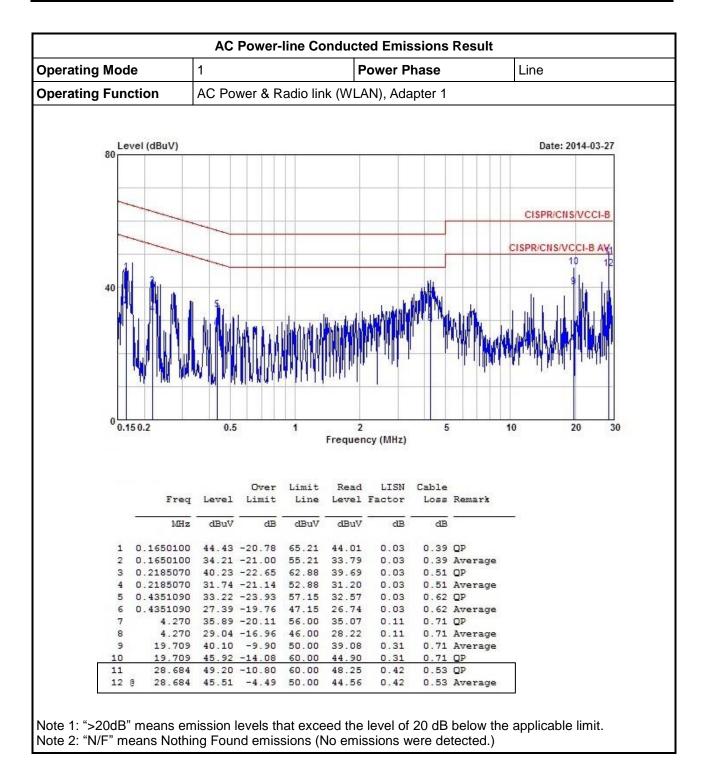




Operating Mode		Power Phase         Neutral								
Operating Functi	ion	AC Power & Radio link (WLAN), Adapter 1								
	1927-202									
80 Level (	dBuV)			1					Date: 2014-03-27	
	-								CISPR/CNS/VCCI-B	
								с	ISPR/CNS/VCCI-B AV	
1									9 11	
40	3								10 12	
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0 0.15 0.2	2	0.5	I II WIYW		2 requenc	y (MHz)	5	10	20 30	
0 0.15 0.2	 	0.5	II			y (MHz)	5	10	20 30	
0 0.15 0.2	2	0.5		F	requenc				20 30	
0 0.15 0.2	Freq	0.5	Over Limit	F	requenc Read		Cable		20 30	
0 0.15 0.2	Freq	Level	Limit	F Limit Line	Read Level	LISN Factor	Cable Loss	Remark	20 30	
0 0.15 0.2			2205 1000	F	requenc Read	LISN	Cable	Remark	20 30	
- 0.15 0.2	Freq	Level dBuV	Limit	F Limit Line	Read Level	LISN Factor	Cable Loss	Remark		
- 0.15 0.2 	Freq MHz .1632710 .1632710	Level dBuV 43.75 32.81	Limit dB -21.55 -22.49	F Limit Line dBuV 65.30 55.30	Read Level dBuV 43.35 32.41	LISN Factor dB 0.02 0.02	Cable Loss dB 0.38 0.38	Remark OP Average	20 30	
- 0.150.2 	Freq MHz .1632710 .1632710 .2165340	Level dBuV 43.75 32.81 39.30	Limit dB -21.55 -22.49 -23.65	F Limit Line dBuV 65.30 55.30 62.95	Read Level dBuV 43.35 32.41 38.77	LISN Factor dB 0.02 0.02 0.02	Cable Loss dB 0.38 0.38 0.51	Remark OP Average QP	20 30	
- 0.150.2 	Freq MHz .1632710 .1632710	Level dBuV 43.75 32.81 39.30 28.45	Limit dB -21.55 -22.49	F Limit Line dBuV 65.30 55.30 62.95	Read Level dBuV 43.35 32.41	LISN Factor dB 0.02 0.02	Cable Loss dB 0.38 0.38 0.51	Remark OP Average OP Average	20 30	
- 0.150.2 	Freq MHz .1632710 .1632710 .2165340 .2165340	Level dBuV 43.75 32.81 39.30 28.45 31.44	Limit dB -21.55 -22.49 -23.65 -24.50	F Limit Line dBuV 65.30 55.30 62.95 52.95	Read Level dBuV 43.35 32.41 38.77 27.92	LISN Factor dB 0.02 0.02 0.02 0.02 0.02	Cable Loss dB 0.38 0.38 0.51 0.51 0.62	Remark OP Average OP Average	20 30	
- 0.150.2 	Freq MHz .1632710 .2165340 .2165340 .4374210 .4374210	Level dBuV 43.75 32.81 39.30 28.45 31.44 27.93	Limit dB -21.55 -22.49 -23.65 -24.50 -25.67	F Limit Line dBuV 65.30 65.30 62.95 52.95 57.11 47.11	Read Level dBuV 43.35 32.41 38.77 27.92 30.79 27.28	LISN Factor dB 0.02 0.02 0.02 0.02 0.02 0.03	Cable Loss dB 0.38 0.38 0.51 0.51 0.62	Remark OP Average OP Average OP Average	20 30	
- 0.150.2 1 0 2 0 3 0 4 0 5 0 5 0 7 8	Freq MHz .1632710 .1632710 .2165340 .4374210 .4374210 .4374210 4.270 4.270	Level dBuV 43.75 32.81 39.30 28.45 31.44 27.93 37.00 24.84	Limit dB -21.55 -22.49 -23.65 -24.50 -25.67 -19.18 -19.00 -21.16	F Limit Line dBuV 65.30 62.95 52.95 57.11 47.11 56.00 46.00	Read Level dBuV 43.35 32.41 27.92 30.79 27.28 36.19 24.03	LISN Factor dB 0.02 0.02 0.02 0.02 0.02 0.03 0.03 0.03	Cable Loss dB 0.38 0.51 0.51 0.62 0.62 0.71 0.71	Remark OP Average OP Average OP Average OP Average	20 30	
- 0.150.2 1 0 2 0 3 0 4 0 5 0 6 0 7 8 9	Freq MHz .1632710 .1632710 .2165340 .4374210 .4374210 .4374210 .4270 4.270 21.171	Level dBuV 43.75 32.81 39.30 28.45 31.44 27.93 37.00 24.84 45.83	Limit dB -21.55 -22.49 -23.65 -24.50 -25.67 -19.18 -19.00 -21.16 -14.17	F Limit Line dBuV 65.30 62.95 52.95 57.11 47.11 56.00 46.00 60.00	Read Level dBuV 43.35 32.41 38.77 27.92 30.79 27.28 36.19 24.03 44.82	LISN Factor dB 0.02 0.02 0.02 0.02 0.02 0.03 0.03 0.10 0.10 0.34	Cable Loss dB 0.38 0.51 0.62 0.62 0.71 0.71 0.67	Remark OP Average OP Average OP Average OP Average OP		
- 0.150.2 1 0 2 0 3 0 4 0 5 0 6 0 7 8 9 10	Freq MHz .1632710 .1632710 .2165340 .2165340 .4374210 .4374210 .4270 4.270 4.270 21.171 21.171	Level dBuV 43.75 32.81 39.30 28.45 31.44 27.93 37.00 24.84 45.83 40.52	Limit dB -21.55 -22.49 -23.65 -24.50 -25.67 -19.18 -19.00 -21.16 -14.17 -9.48	F Limit Line dBuV 65.30 62.95 52.95 57.11 47.11 56.00 46.00 60.00 50.00	Read Level dBuV 43.35 32.41 38.77 27.92 30.79 27.28 36.19 24.03 44.82 39.51	LISN Factor dB 0.02 0.02 0.02 0.02 0.02 0.03 0.03 0.10 0.10 0.34 0.34	Cable Loss dB 0.38 0.51 0.51 0.62 0.62 0.71 0.71 0.67 0.67	Remark OP Average OP Average OP Average OP Average OP Average		
- 0.15 0.2 1 0 2 0 3 0 4 0 5 0 6 0 7 8 9 10 11	Freq MHz .1632710 .1632710 .2165340 .4374210 .4374210 .4374210 .4270 4.270 4.270 21.171 21.171 28.686	Level dBuV 43.75 32.81 39.30 28.45 31.44 27.93 37.00 24.84 45.83 40.52 45.67	Limit dB -21.55 -22.49 -23.65 -24.50 -25.67 -19.18 -19.00 -21.16 -14.17 -9.48 -14.33	F Limit Line dBuV 65.30 62.95 52.95 57.11 47.11 56.00 60.00 50.00 60.00	Read Level dBuV 43.35 32.41 38.77 27.92 30.79 27.28 36.19 24.03 44.82 39.51 44.71	LISN Factor dB 0.02 0.02 0.02 0.02 0.03 0.03 0.03 0.10 0.10 0.34 0.34 0.34	Cable Loss dB 0.38 0.51 0.62 0.62 0.71 0.71 0.77 0.67 0.53	Remark OP Average OP Average OP Average OP Average OP Average OP		
- 0.150.2 1 0 2 0 3 0 4 0 5 0 6 0 7 8 9 10	Freq MHz .1632710 .1632710 .2165340 .4374210 .4374210 .4374210 .4270 4.270 4.270 21.171 21.171 28.686	Level dBuV 43.75 32.81 39.30 28.45 31.44 27.93 37.00 24.84 45.83 40.52 45.67	Limit dB -21.55 -22.49 -23.65 -24.50 -25.67 -19.18 -19.00 -21.16 -14.17 -9.48	F Limit Line dBuV 65.30 62.95 52.95 57.11 47.11 56.00 60.00 50.00 60.00	Read Level dBuV 43.35 32.41 38.77 27.92 30.79 27.28 36.19 24.03 44.82 39.51 44.71	LISN Factor dB 0.02 0.02 0.02 0.02 0.03 0.03 0.10 0.10 0.34 0.34 0.34	Cable Loss dB 0.38 0.51 0.62 0.62 0.71 0.71 0.77 0.67 0.53	Remark OP Average OP Average OP Average OP Average OP Average		

#### 3.1.5 Test Result of AC Power-line Conducted Emissions







## 3.2 Emission Bandwidth

#### 3.2.1 Emission Bandwidth (EBW) Limit

	Emission Bandwidth (EBW) Limit
UN	I Devices
$\bowtie$	For the 5.15-5.25 GHz band, the maximum conducted output power shall not exceed the lesser of 50 mW or 4 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz.
	For the 5.25-5.35 GHz band, the maximum conducted output power shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz.
	For the 5.47-5.725 GHz band, the maximum conducted output power shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz.
	For the 5.725-5.825 GHz band, the maximum conducted output power shall not exceed the lesser of 1 W or 17 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz
LE-	LAN Devices
$\square$	For the band 5.15-5.25 GHz, the maximum e.i.r.p. shall not exceed 200 mW or 10 + 10 log B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz.
	For the 5.25-5.35 GHz band, the maximum e.i.r.p. shall not exceed 1.0 W or 17 + 10 log B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz
	For the 5.47-5.6 GHz band and 5.65-5.725 GHz band, the maximum e.i.r.p. shall not exceed 1.0 W or 17 + 10 log B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz
	For the 5.725-5.825 GHz band, the maximum e.i.r.p. shall not exceed 4.0 W or 23 + 10 log B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz.

#### 3.2.2 Measuring Instruments

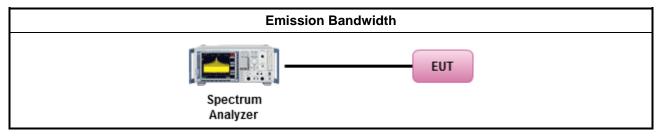
Refer a test equipment and calibration data table in this test report.

#### 3.2.3 Test Procedures

	Test Method									
$\square$	For	the emission bandwidth shall be measured using one of the options below:								
	$\square$	Refer as FCC KDB 789033 v01r03, clause C for EBW and clause D for OBW measurement.								
		Refer as ANSI C63.10, clause 6.9.1 for occupied bandwidth testing.								
	$\square$	Refer as IC RSS-Gen, clause 4.6 for bandwidth testing.								
$\square$	For	conducted measurement.								
		The EUT supports single transmit chain and measurements performed on this transmit chain.								
		The EUT supports diversity transmitting and the results on transmit chain port 1 is the worst case.								
	$\square$	The EUT supports multiple transmit chains using options given below:								
		Option 1: Multiple transmit chains measurements need to be performed on one of the active transmit chains (antenna outputs). All measurement had be performed on transmit chains 1.								
		Option 2: Multiple transmit chains measurements need to be performed on each transmit chains individually (antenna outputs). All measurement had be performed on all transmit chains.								



#### 3.2.4 Test Setup





UNII Emission Bandwidth Result (5150-5250MHz band)																	
Condi	Condition				Emission Bandwidth (MHz)												
Modulation	Modulation Mode N <sub>TX</sub>	Freq.	ç	99% Ba	ndwidt	n	2	6dB Ba	ndwidt	h	Power	r Limit					
		(MHz)	Chain- Port 1	Chain- Port 2	Chain- Port 3	Chain- Port 4	Chain- Port 1	Chain- Port 2	Chain- Port 3	Chain- Port 4	99% BW	26dB BW					
11a	2	5180	16.75	16.79		-	20.93	21.45			16.24	17.00					
11a	2	5200	16.75	16.79		-	21.16	21.39			16.24	17.00					
11a	2	5240	16.75	16.79			20.99	21.39			16.24	17.00					
VHT20	2	5180	17.87	17.91			21.86	21.86			16.52	17.00					
VHT20	2	5200	17.91	17.84		-	21.91	21.86			16.51	17.00					
VHT20	2	5240	17.91	17.87		-	21.80	21.80			16.52	17.00					
VHT40	2	5190	36.79	36.86			44.52	44.41			17.00	17.00					
VHT40	2	5230	36.73	36.79			44.52	44.41			17.00	17.00					
VHT80	2	5210	75.77	75.77			83.48	83.48			17.00	17.00					
Res	ult						Com	plied		Complied							

#### 3.2.5 Test Result of Emission Bandwidth

worst Emission	Bandwidth Plots
99% Bandwidth	26dB Bandwidth
pectrum	RefLevel         20.00 dBm         Offset         11.50 dB         RBW         1 MHz           Att         30 dB         SWT         1 ms         VBW         3 MHz
Sa View         M1[1]         5.55 dBm           I dBm         Occ Bw         75.774240232 MHz           JBm         Occ Bw         75.774240232 MHz	e1pk View               M1[1]             -20.09 dBm                 10 dBm               5.168493 CH                 10 dBm               01 5.714 dBm                 0 dBm               01 15.714 dBm
0 dBm	-10 dBm
0 dBm	-30 dBm
0 dBm	-50 dBm
691 pts Span 85.0 MHz	-70 dBm F1 CF 5.21 GHz 691 pts 8pan 160.0 MHz



## 3.3 **RF Output Power**

#### 3.3.1 RF Output Power Limit

	Maximum Conducted Output Power Limit								
UN	II Devices								
$\boxtimes$	For the 5.15-5.25 GHz band, the maximum conducted output power ( $P_{Out}$ ) shall not exceed the lesser of 50 mW or 4 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz. If $G_{TX} > 6$ dBi, then $P_{Out} = 17 - (G_{TX} - 6)$ .								
	For the 5.25-5.35 GHz band, the maximum conducted output power ( $P_{Out}$ ) shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz. If $G_{TX} > 6$ dBi, then $P_{Out} = 24 - (G_{TX} - 6)$ .								
	For the 5.47-5.725 GHz band, the maximum conducted output power ( $P_{Out}$ ) shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz. If $G_{TX}$ > 6 dBi, then $P_{Out} = 24 - (G_{TX} - 6)$ .								
	For the 5.725-5.825 GHz band:								
	Point-to-multipoint systems (P2M): the maximum conducted output power ( $P_{Out}$ ) shall not exceed the lesser of 1 W or 17 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz. If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)$ .								
	Point-to-point systems (P2P): the maximum conducted output power ( $P_{Out}$ ) shall not exceed the lesser of 1 W or 17 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz. If $G_{TX} > 23$ dBi, then $P_{Out} = 30 - (G_{TX} - 23)$ .								
LE-	LAN Devices								
$\boxtimes$	For the 5.15-5.25 GHz band, the maximum e.i.r.p. shall not exceed 200 mW or 10 + 10 log B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz.								
	For the 5.25-5.35 GHz band, the maximum e.i.r.p. shall not exceed 1.0 W or 17 + 10 log B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz								
	For the 5.47-5.6 GHz band and 5.65-5.725 GHz band, the maximum e.i.r.p. shall not exceed 1.0 W or 17 + 10 log B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz								
	For the 5.725-5.825 GHz band, the maximum e.i.r.p. shall not exceed 4.0 W or 23 + 10 log B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz.								
	Point-to-multipoint systems (P2M): the maximum e.i.r.p. shall not exceed 4.0 W or 23 + 10 log B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz.								
	$\label{eq:point-to-point systems (P2P): the maximum e.i.r.p. shall not exceed 4.0 W or 23 + 10 log B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz. If e.i.r.p. > 36 dBm, G_{TX} \leq P_{Out}$								
	t = maximum conducted output power in dBm, = the maximum transmitting antenna directional gain in dBi.								

#### 3.3.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.



#### 3.3.3 Test Procedures

	Test Method									
$\boxtimes$	Max	imum Conducted Output Power								
		Refer as FCC KDB 789033 v01r03, clause E Method SA-1 (spectral trace averaging).								
		Refer as FCC KDB 789033 v01r03, clause E Method SA-1 Alt. (RMS detection with slow sweep speed)								
		Refer as FCC KDB 789033 v01r03, clause E Method SA-2 (spectral trace averaging).								
	Refer as FCC KDB 789033 v01r03, clause E Method SA-2 Alt. (RMS detection with slow sw speed)									
	Wid	eband RF power meter and average over on/off periods with duty factor								
	$\boxtimes$	Refer as FCC KDB 789033 v01r03, clause E Method PM-G (using a gated RF average power meter).								
$\boxtimes$	For	conducted measurement.								
		The EUT supports single transmit chain and measurements performed on this transmit chain.								
		The EUT supports diversity transmitting and the results on transmit chain port 1 is the worst case.								
	$\boxtimes$	The EUT supports multiple transmit chains using options given below: Refer as FCC KDB 662911, In-band power measurements. Using the measure-and-sum approach, measured all transmit ports individually. Sum the power (in linear power units e.g., mW) of all ports for each individual sample and save them.								
	$\boxtimes$	If multiple transmit chains, EIRP calculation could be following as methods: $P_{total} = P_1 + P_2 + + P_n$ (calculated in linear unit [mW] and transfer to log unit [dBm]) EIRP <sub>total</sub> = P <sub>total</sub> + DG								

## 3.3.4 Test Setup

RF Output Power (Power Meter)						
EUT Power Meter						



Directional Gain (DG) Result									
Transmit Chains No		1	2	-	-				
Maximum G <sub>ANT</sub> (dBi)	)	0	0	-	-				
Modulation Mode	DG (dBi)	N <sub>TX</sub>	N <sub>ss</sub>	STBC	Array Gain (dB)				
11a,6-54Mbps	0	2	1	-	-				
HT20,M0-15	0	2	1	-	-				
HT40,M0-15	0	2	1	-	-				
VHT20,M0-8	0	2	1	-	-				
VHT40,M0-9	0	2	1	-	-				
VHT80,M0-9	0	2	1		-				
Note 1: For CDD transmissions Directional Gain (DG) = Array Gain = 0 dB (i.e., Array Gain = 0 dB (i.e.,	G <sub>ANT</sub> + Arra no array ga	ay Gain, where in) for N <sub>TX</sub> ≤ 4;	Array Gain is as	follows:					

#### 3.3.5 Directional Gain for Power Measurement



N	Maximum Conducted (Average) Output Power (5150-5250MHz band)										
Condit	RF Output Power (dBm)										
Modulation Mode	N <sub>TX</sub>	Freq. (MHz)	Chain Port 1	Chain Port 2	Chain Port 3	Chain Port 4	Sum Chain	Power Limit	DG (dBi)	EIRP Power	EIRP Limit
11a	2	5180	13.78	13.75			16.78	17.00	0	16.78	23.00
11a	2	5200	13.49	13.21			16.36	17.00	0	16.36	23.00
11a	2	5240	13.26	13.35			16.32	17.00	0	16.32	23.00
HT20	2	5180	13.67	13.73			16.71	17.00	0	16.71	23.00
HT20	2	5200	13.50	13.61			16.57	17.00	0	16.57	23.00
HT20	2	5240	13.29	13.47			16.39	17.00	0	16.39	23.00
HT40	2	5190	13.78	13.88			16.84	17.00	0	16.84	23.00
HT40	2	5230	13.56	13.42			16.50	17.00	0	16.50	23.00
VHT20	2	5180	13.75	13.76			16.77	17.00	0	16.77	23.00
VHT20	2	5200	13.53	13.64			16.60	17.00	0	16.60	23.00
VHT20	2	5240	13.33	13.51			16.43	17.00	0	16.43	23.00
VHT40	2	5190	13.82	13.90			16.87	17.00	0	16.87	23.00
VHT40	2	5230	13.61	13.45			16.54	17.00	0	16.54	23.00
VHT80	2	5210	13.10	13.05			16.09	17.00	0	16.09	23.00
Resu	ılt			Complied							

## 3.3.6 Test Result of Maximum Conducted Output Power



## 3.4 Peak Power Spectral Density

#### 3.4.1 Peak Power Spectral Density Limit

	Peak Power Spectral Density Limit							
UN	II Devices							
$\square$	For the 5.15-5.25 GHz band, the peak power spectral density (PPSD) $\leq$ 4 dBm/MHz. If G <sub>TX</sub> > 6 dBi, then PPSD = 4 - (G <sub>TX</sub> - 6).							
	For the 5.25-5.35 GHz band, the peak power spectral density (PPSD) $\leq$ 11 dBm/MHz. If G <sub>TX</sub> > 6 dBi, then PPSD= 11 - (G <sub>TX</sub> - 6).							
	For the 5.47-5.725 GHz band, the peak power spectral density (PPSD) $\leq$ 11 dBm/MHz. If G <sub>TX</sub> > 6 dBi, then PPSD= 11 - (G <sub>TX</sub> - 6).							
	For the 5.725-5.825 GHz band:							
	Point-to-multipoint systems (P2M): the peak power spectral density (PPSD) $\leq$ 17 dBm/MHz. If G <sub>TX</sub> > 6 dBi, then PPSD= 17 – (G <sub>TX</sub> – 6).							
	Point-to-point systems (P2P): the peak power spectral density (PPSD) $\leq$ 17 dBm/MHz. If G <sub>TX</sub> > 23 dBi, then PPSD = 17 - (G <sub>TX</sub> - 23).							
LE-	LAN Devices							
$\square$	For the 5.15-5.25 GHz band, the peak power spectral density (PPSD) $\leq$ 4 dBm/MHz and the e.i.r.p. peak power spectral density (PPSD) $\leq$ 10 dBm/MHz.							
	For the 5.25-5.35 GHz band, the peak power spectral density (PPSD) $\leq$ 11 dBm/MHz and the e.i.r.p. peak power spectral density (PPSD) $\leq$ 17 dBm/MHz.							
	For the 5.47-5.6 GHz band and 5.65-5.725 GHz band, the peak power spectral density (PPSD) $\leq$ 11 dBm/MHz and the e.i.r.p. peak power spectral density (PPSD) $\leq$ 17 dBm/MHz.							
	For the 5.725-5.825 GHz band, the peak power spectral density (PPSD) $\leq$ 17 dBm/MHz and the e.i.r.p. peak power spectral density (PPSD) $\leq$ 23 dBm/MHz.							
pov	<b>SD</b> = peak power spectral density that he same method as used to determine the conducted output ver shall be used to determine the power spectral density. And power spectral density in dBm/MHz = the maximum transmitting antenna directional gain in dBi.							

#### 3.4.2 Measuring Instruments

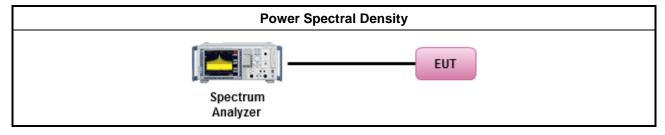
Refer a test equipment and calibration data table in this test report.



#### 3.4.3 Test Procedures

		Test Method									
$\boxtimes$	outp func	eak power spectral density procedures that the same method as used to determine the conducted utput power shall be used to determine the peak power spectral density and use the peak search unction on the spectrum analyzer to find the peak of the spectrum. For the peak power spectral density hall be measured using below options:									
	Refer as FCC KDB 789033 v01r03, F)5) power spectral density can be measured using resolut bandwidths < 1 MHz provided that the results are integrated over 1 MHz bandwidth										
		Refer as FCC KDB 789033 v01r03, clause E Method SA-1 (spectral trace averaging).									
	Refer as FCC KDB 789033 v01r03, clause E Method SA-1 Alt. (RMS detection with slow swe speed)										
		Refer as FCC KDB 789033 v01r03, clause E Method SA-2 (spectral trace averaging).									
		Refer as FCC KDB 789033 v01r03, clause E Method SA-2 Alt. (RMS detection with slow sweep speed)									
$\boxtimes$	For	conducted measurement.									
		The EUT supports single transmit chain and measurements performed on this transmit chain.									
		The EUT supports diversity transmitting and the results on transmit chain port 1 is the worst case.									
	$\boxtimes$	The EUT supports multiple transmit chains using options given below:									
		Option 1: Measure and sum the spectra across the outputs. Refer as FCC KDB 662911, In-band power measurements. Using the measure-and-sum approach, measured all transmit ports individually. Sum the power (in linear power units e.g., mW) of all ports for each individual sample and save them.									
		Option 2: Measure and add 10 log(N) dB, where N is the number of transmit chains. Refer as FCC KDB 662911, In-band power spectral density (PSD). Performed at each transmit chains and each transmit chains shall be compared with the limit have been reduced with 10 log(N). Or each transmit chains shall be add 10 log(N) to compared with the limit.									
		If multiple transmit chains, EIRP PPSD calculation could be following as methods: $PPSD_{total} = PPSD_1 + PPSD_2 + + PPSD_n$ (calculated in linear unit [mW] and transfer to log unit [dBm]) $EIRP_{total} = PPSD_{total} + DG$									
	$\boxtimes$	Each individually PPSD plots refer as test report clause 3.3.5 with each individually PPSD plots.									

#### 3.4.4 Test Setup





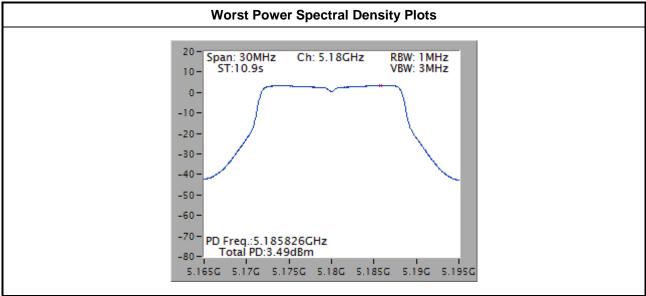
3.4.5	<b>Directional Gain for Powe</b>	r Spectral Density	v Measurement
01110		i opooliai Donon	, moadar officine

Directional Gain (DG) Result								
Transmit Chains No.		1	2					
Maximum G <sub>ANT</sub> (dBi)		0	0					
Modulation Mode	DG (dBi)	Ν <sub>τχ</sub>	N <sub>ss</sub>	STBC	Array Gain (dB)			
11a,6-54Mbps	3.01	2	1					
VHT20,M0-8	3.01	2	1					
VHT40,M0-9	3.01	2	1					
VHT80,M0-9	3.01	2	1					
Note 1: For all transmitter outputs with equal antenna gains, directional gain is to be computed as follows: Any transmit signals are correlated, Directional Gain = G <sub>ANT</sub> + 10 log(N <sub>TX</sub> )								



Peak Power Spectral Density Result (5150-5250MHz band)									
Cond	ition			Peak Power Spectral Density (dBm/MHz)					
Modulation Mode	Ντχ	Freq. (MHz)	Sum Chain	PSD Limit	DG (dBi)	EIRP PSD	EIRP Limit		
11a	2	5180	3.75	4.00	3.01	6.76	10.00		
11a	2	5200	3.36	4.00	3.01	6.37	10.00		
11a	2	5240	3.41	4.00	3.01	6.42	10.00		
VHT20	2	5180	3.27	4.00	3.01	6.28	10.00		
VHT20	2	5200	3.14	4.00	3.01	6.15	10.00		
VHT20	2	5240	3.08	4.00	3.01	6.09	10.00		
VHT40	2	5190	0.12	4.00	3.01	3.13	10.00		
VHT40	2	5230	-0.10	4.00	3.01	2.91	10.00		
VHT80	2	5210	-3.44	4.00	3.01	-0.43	10.00		
Res	ult			•	Complied	•	•		

#### 3.4.6 Test Result of Peak Power Spectral Density



Note 1: Peak Power Spectral Density w/o Duty Factor.



#### 3.5 Peak Excursion

#### 3.5.1 Peak Excursion Limit

	Peak Excursion Limit
UN	II Devices
	Peak excursion $\leq$ 13 dB. The ratio of the maximum of the peak-max-hold spectrum to the maximum of the average spectrum for continuous transmission does not exceed 13 dB. (Earlier procedures that required computing the ratio of the two spectra at each frequency across the emission bandwidth can lead to unintended failures at band edges and will no longer be required.)
LE-	LAN Devices
$\boxtimes$	N/A

#### 3.5.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

#### 3.5.3 Test Procedures

		Test Method
$\boxtimes$	Refe	er as FCC KDB 789033 v01r03, clause G peak excursion method.
$\square$		ing each modulation mode on a single channel is sufficient to demonstrate compliance with the k excursion requirement
$\boxtimes$	For	conducted measurement.
	$\boxtimes$	Testing a single output port is sufficient to demonstrate compliance with the peak excursion.
	$\boxtimes$	Test result plots refer as test report clause 3.3.5 with peak excursion ratio of the maximum of the peak-max-hold spectrum to the maximum of the average spectrum.

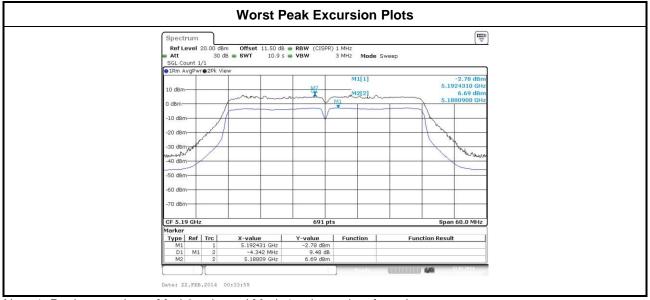
#### 3.5.4 Test Setup

Peak Excursion
EUT
Spectrum Analyzer



#### 3.5.5 Test Result of Peak Excursion

			Peak Exc	cursion (dE	3)			
Mode	N			Мо	dulation M	ode		Limit
Wode	Ν <sub>τχ</sub>	Freq. (MHz)	BPSK	QPSK	16QAM	64QAM	256QAM	Linin
11a	2	5180	7.84	8.22	7.67	7.98	-	13
VHT20	2	5180	8.31	8.17	8.25	7.41	7.08	13
VHT40	2	5190	8.52	7.83	8.35	7.12	7.13	13
VHT80	2	5210	7.96	7.66	6.48	6.92	5.79	13



Note 1: Peak excursion = Mark2 value - (Mark 1 value + duty factor)



### 3.6 Transmitter Radiated Unwanted Emissions and Band Edge

#### 3.6.1 Transmitter Radiated Unwanted Emissions and Band Edge Limit

Unwanted emiss	sions below 1 GHz and re	stricted band emissions a	bove 1GHz limit
Frequency Range (MHz)	Field Strength (uV/m)	Field Strength (dBuV/m)	Measure Distance (m)
0.009~0.490	2400/F(kHz)	48.5 - 13.8	300
0.490~1.705	24000/F(kHz)	33.8 - 23	30
1.705~30.0	30	29	30
30~88	100	40	3
88~216	150	43.5	3
216~960	200	46	3
Above 960	500	54	3
Note 1: Test distance for fr	equencies at or above 30	MHz. measurements may be	performed at a distance

Note 1: Test distance for frequencies at or above 30 MHz, measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse of linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements).

Note 2: Test distance for frequencies at below 30 MHz, measurements may be performed at a distance closer than the EUT limit distance; however, an attempt should be made to avoid making measurements in the near field. When performing measurements below 30 MHz at a closer distance than the limit distance, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two or more distances on at least one radial to determine the proper extrapolation factor or by using the square of an inverse linear distance extrapolation factor (40 dB/decade). The test report shall specify the extrapolation method used to determine compliance of the EUT.

U	n-restricted band emissions above 1GHz Limit
Operating Band	Limit
5.15 - 5.25 GHz	e.i.r.p27 dBm [68.2 dBuV/m@3m]
5.25 - 5.35 GHz	e.i.r.p27 dBm [68.2 dBuV/m@3m]
5.47 - 5.725 GHz	e.i.r.p27 dBm [68.2 dBuV/m@3m]
5.725 - 5.825 GHz	5.715 5.725 GHz: e.i.r.p17 dBm [78.2 dBuV/m@3m] 5.825 5.835 GHz: e.i.r.p17 dBm [78.2 dBuV/m@3m] Other un-restricted band: e.i.r.p27 dBm [68.2 dBuV/m@3m]

Note 1: Measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse of linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements).

#### 3.6.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

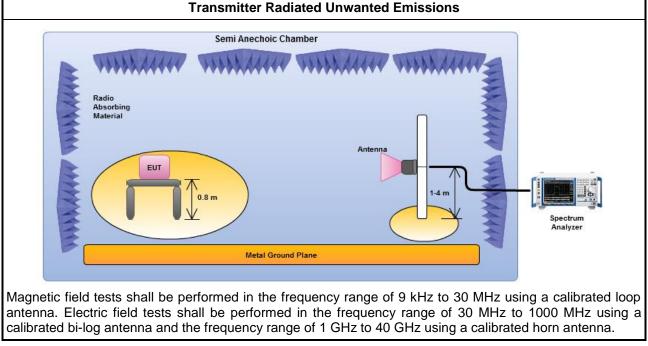


#### 3.6.3 Test Procedures

		Test Method
$\boxtimes$	perfe equi abov are i be e dista	surements may be performed at a distance other than the limit distance provided they are not ormed in the near field and the emissions to be measured can be detected by the measurement pment. Measurements shall not be performed at a distance greater than 30 m for frequencies ve 30 MHz, unless it can be further demonstrated that measurements at a distance of 30 m or less mpractical. When performing measurements at a distance other than that specified, the results shall xtrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse of linear ance for field-strength measurements, inverse of linear distance-squared for power-density surements).
$\square$	For	the transmitter unwanted emissions shall be measured using following options below:
	$\square$	Refer as FCC KDB 789033 v01r03, clause H)2) for unwanted emissions into non-restricted bands.
	$\boxtimes$	Refer as FCC KDB 789033 v01r03, clause H)1) for unwanted emissions into restricted bands.
		Refer as FCC KDB 789033 v01r03, H)6) Method AD (Trace Averaging).
		Refer as FCC KDB 789033 v01r03, H)6) Method VB (Reduced VBW).
		Refer as ANSI C63.10, clause 4.2.3.2.3 (Reduced VBW). VBW $\geq$ 1/T, where T is pulse time.
		Refer as ANSI C63.10, clause 4.2.3.2.4 average value of pulsed emissions.
		Refer as FCC KDB 789033 v01r03, clause H)5) measurement procedure peak limit.
		Refer as ANSI C63.10, clause 4.2.3.2.2 measurement procedure peak limit.
$\boxtimes$	For	radiated measurement.
	$\square$	Refer as ANSI C63.10, clause 6.4 for radiated emissions from below 30 MHz.
	$\square$	Refer as ANSI C63.10, clause 6.5 for radiated emissions from 30 MHz to 1000 MHz.
	$\square$	Refer as ANSI C63.10, clause 6.6 for radiated emissions from above 1 GHz.
	For	conducted and cabinet radiation measurement, refer as FCC KDB 789033 v01r03, clause H)3).
		For conducted unwanted emissions into non-restricted bands (relative emission limits). Devices with multiple transmit chains: Refer as FCC KDB 662911, when testing out-of-band and spurious emissions against relative emission limits, tests may be performed on each output individually without summing or adding 10 log(N) if the measurements are made relative to the in-band emissions on the individual outputs.
		For conducted unwanted emissions into restricted bands (absolute emission limits). Devices with multiple transmit chains using options given below: (1) Measure and sum the spectra across the outputs or (2) Measure and add 10 log(N) dB
		For FCC KDB 662911 The methodology described here may overestimate array gain, thereby resulting in apparent failures to satisfy the out-of-band limits even if the device is actually compliant. In such cases, compliance may be demonstrated by performing radiated tests around the frequencies at which the apparent failures occurred.



#### 3.6.4 Test Setup



Note: Test distance is 3m.

#### 3.6.5 Transmitter Radiated Unwanted Emissions (Below 30MHz)

All amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.



Iodulation Mode	•	VI	HT40			Tes	t Freq. (I	MHz)		5190		
Operating Mode		1				Pola	arization			Н		
Lev	el (dBuV/m	,								1	Date: 201	4-03-11
81.0												
72.0												
63.0											FCC CI	ASS-B
54.0												
45.0	1		+ *			1			5			
36.0	2	-							Ē			
27.0												
18.0												
9.0												
030	100.	2	200.	300.	400.	500.	600.	7(	00.	800.	900.	1000
						Frequenc						
				0ver	Limit	Read	Antenna	Cable	Preamp	A/Pos	T/Pos	
	Fre	q	Level	Limit			Factor				-	Remark
	MHz		dBuV/m	dB	dBuV/m		dB/m	dB	dB	cm	deg	
1	125.		35.94		43.50				31.66			Peak
2	151. 250.		42.87	-3.13	43.50 46.00	49.73 60.84			31.63 31.51			Peak Peak
4			42.07		46.00	54.10			31.41	143	198	QP
5					46.00				31.39			Peak
6					46.00		22.47		31.37			Peak
ote 1: ">20dB" m												
ote 2: "N/F" mea	ne Nothi	ina	Found	enuriou	e omieei	ione (Na	n enuriou	e amie	eione w	ara dat	hatra	)

#### 3.6.6 Transmitter Radiated Unwanted Emissions (Below 1GHz)





Modulation Mode	Ň	VHT40			Tes	t Freq. (	MHz)		5190		
Operating Mode		1			Pola	arization			V		
امینم ا	(dBu\//m)									Date: 20'	14-03-11
90 Level	(dBuV/m)										14-03-11
81.0											
72.0											
63.0											
54.0										FCC C	LASS-B
45.0											
36.0	<u> </u>	4						6			
27.0											
18.0											
9.0											
0 <mark>30</mark>	100.	200.	300.	400.	500. Frequenc	600. y (MHz)	70	)0.	800.	900.	1000
			0ver	Limit	Read	Antenna	Cable	Preamp	A/Pos	T/Pos	
	Freq	Level		Line		Factor				.,	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1						14.96		31.78	100	8	-
2		38.31		43.50				31.69			
3		35.69			54.36			31.66			Peak
4		33.52			51.49			31.51			Peak
5		41.76			53.45	18.21 22.10		31.41			Peak
0	749.74	54.50	-11.42	40.00	41.99	22.10	1.00	31.39			Peak
lote 1: ">20dB" me	eans spui	rious em	ission le	evels that	t excee	ed the lev	el of 20	) dB be	low the	e applic	able lin
lote 2: "N/F" mean											



Modulation Mod	le	11a			Tes	t Freq.	(MHz)		5180			
Operating Mode	•	1			Pola	arizatio	'n		Н			
Le	vel (dBuV/m)									Date:	2014	-02-19
80 72.0										EC		T15E
64.0			- <u>LIL</u>		J						PAR	TIJE
56.0	23	4	Ļ						FC	C PAR	<b>F15E</b>	(AVG)
48.0						_						
40.0												
32.0												
24.0												
16.0												
8.0												
0 <mark></mark>	00 4000.600	D. 8000.	12000.	16000.	20000		00. 28	000. :	32000.	360	00.	40000
			0		Frequence		- Cable	Duranum	A /D-	- T/D		
	Freq	l evel	Over Limit				a Cable Loss			5 I/P		Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m		dB	cm	d	eg	
1		0 45.83		54.00				33.08				Average
2		0 57.08 0 59.42						33.08 33.07				<sup>p</sup> eak Peak
4		0 54.69						35.47				Peak
Note 1: ">20dB" ı												ble limi
Note 2: "N/F" me									ere de	etecte	ed.)	
Note 3: Measurei Note 4: For restri									field of	rona	th of	e moooi
NOTE 4. LOL LEST				uremen		SUITCLE	ะแ, สร เก		neia si	uengi	ui as	s meast
	Peak-Dete	ctor moot	te tha M	/- Limit o	o that t			s not no	of had			ni ha

#### 3.6.7 Transmitter Radiated Unwanted Emissions (Above 1GHz) for 11a



odulation N	lod	e		11a						Tes	st F	req.	(MH:	z)		51	80		
perating Mo	de			1						Ро	lariz	zatio	n			V			
8	Lev	el (dBu	iV/m)															Date: 201	4-02-19
72.				mr			╘╕╻		h - f		-							FCC	RT15E
64.	0		3			_													
56.	0		1			4										_	FCC	PART15	e (AVG)
48.	0		1																
40.																			
32.																			
24.																			
16.																			
8.																			
	<sup>0</sup> 100	0 4000	0.600	0.800	0.	12	000.	160	000.	2000		240	00.	280	000.	3200	)0.	36000.	4000
										Frequen									
							ver										'Pos	T/Pos	
			Freq	L	evel	. L	imit	Li	ne	Leve!	l Fa	ctor	Lo	SS	Facto	r			Remar
		-			uV/m									 D					
	1		MHz 50 0				dB 7 45			dBuV 40.84		1 86			dB 33.08		Cm	deg	Avera
	2									52.18					33.08				Peak
	3														33.07				Peak
	4														35.47				Peak
ote 1: ">20dl	2" r	00000	0.001	iriou	e	nice	ion l		the	t ovoo	od +	hele		5 D			, th	annlia	ahla li
ote 2: "N/F" ı																were	e ue	lected.)	
ote 3: Measu																fial	d		
	STRIC	THA D	nna	s In	പറമ	ыкr	neag	uren	nent	IS IUII	V SI	IIIICIE	ин А	S IN	H MAX	1101	1 91	HOUTD 2	is mea
ote 4: For re																			
	e P																	pe repo	





perating Mode         1         Polarization         H           0         Level (dBuV/m)         Date: 2014-02-19         Date: 2014-02-19           72.0	80 72.0 64.0 56.0 48.0 40.0 32.0 24.0 16.0 8.0	Level (dBuV/n										FCCPA	RT15E
72.0       FCC PARTISE         64.0       3       4	72.0 64.0 56.0 48.0 40.0 32.0 24.0 16.0 8.0											FCCPA	RT15E
72.0       FCC PARTISE         64.0       3       4	72.0 64.0 56.0 48.0 40.0 32.0 24.0 16.0 8.0											FCCPA	RT15E
64.0 56.0 48.0 48.0 40.0 32.0 24.0 16.0 0 1000 4000.6000.8000. 12000. 16000. 20000. 24000. 28000. 32000. 36000. 40000 Frequency (MHz) Ver Limit Read Antenna Cable Preamp A/Pos T/Pos Freq Level Limit Line Level Factor Loss Factor Remark MHz dBuV/m dB dBuV/m dBuV dB/m dB dB cm deg 1 5280.00 56.47 -11.73 68.20 50.57 31.91 7.06 33.07 Peak 2 5360.00 46.23 -7.77 54.00 40.23 31.94 7.12 33.06 Peak	64.0 56.0 48.0 40.0 32.0 24.0 16.0 8.0										FCO		
56.0       7       4       6       FCC PARTISE (AVG)         48.0       7       4       6       6       FCC PARTISE (AVG)         48.0       7       6       6       6       6       6         40.0       32.0       6       6       6       6       6       6         24.0       6       6       6       6       6       6       6       6         16.0       8.0       6	56.0 48.0 40.0 32.0 24.0 16.0 8.0			4							FCO	C PART15	(AVG)
36.0       1	48.0 40.0 32.0 24.0 16.0 8.0	) ) ) ) )	000. 8000.								FCO	2 PART15	E (AVG)
40.0 32.0 24.0 16.0 8.0 0 1000 4000.6000.8000. 12000. 16000. 20000. 24000. 28000. 32000. 36000. 40000 Frequency (MHz) Over Limit Read Antenna Cable Preamp A/Pos T/Pos Freq Level Limit Line Level Factor Loss Factor Remark MHz dBuV/m dB dBuV/m dBuV dB/m dB dB cm deg 1 5280.00 56.47 -11.73 68.20 50.57 31.91 7.06 33.07 Peak 2 5360.00 46.23 -7.77 54.00 40.23 31.94 7.12 33.06 Average 3 5360.00 59.11 -14.89 74.00 53.11 31.94 7.12 33.06 Peak	40.0 32.0 24.0 16.0 8.0	) 	000. 8000.										
32.0       36.0       16.0       32.0       36.0       16.0       32.0       32.0       36.0       40000       16.0       20000.       24000.       28000.       32000.       36000.       40000       Frequency (MHz)         0       1000 4000.6000.8000.       12000.       16000.       20000.       24000.       28000.       32000.       36000.       40000         Freq Level Limit Line Level Factor Loss Factor       Coss Factor       Remark         MHz dBuV/m dB dBuV/m dBuV dB/m dB dB cm deg         1       5280.00       56.47       -11.73       68.20       50.57       31.91       7.06       33.07         Peak         2       5360.00       46.23       -7.77       54.00       40.23       31.94       7.12       33.06         Peak         3       5360.00       59.11       -14.89       74.00       53.11       31.94       7.12       33.06	32.0 24.0 16.0 8.0	)	000. 8000.										
24.0       16.0       100       1000	24.0 16.0 8.0	)	000. 8000.										
16.0       8.0       0 <td>16.0 8.0</td> <td>)</td> <td>000. 8000.</td> <td></td>	16.0 8.0	)	000. 8000.										
8.0 0 1000 4000.6000.8000. 12000. 16000. 20000. 24000. 28000. 32000. 36000. 40000 Frequency (MHz) 0ver Limit Read Antenna Cable Preamp A/Pos T/Pos Freq Level Limit Line Level Factor Loss Factor Remark MHz dBuV/m dB dBuV/m dBuV dB/m dB dB cm deg 1 5280.00 56.47 -11.73 68.20 50.57 31.91 7.06 33.07 Peak 2 5360.00 46.23 -7.77 54.00 40.23 31.94 7.12 33.06 Average 3 5360.00 59.11 -14.89 74.00 53.11 31.94 7.12 33.06 Peak	8.0		000. 8000.										
0 1000 4000.6000.8000. 12000. 12000. 12000. 12000. 12000. 12000. 12000. 1000. 20000. 24000. 28000.			000.8000.										
Frequency (MHz)           Over         Limit         Read         Antenna         Cable         Preamp         A/Pos         T/Pos           Freq         Level         Limit         Line         Level         Factor         Loss         Factor         Remark           MHz         dBuV/m         dB         dBuV/m         dBuV/m         dBuV         dB/m         dB         cm         deg           1         5280.00         56.47         -11.73         68.20         50.57         31.91         7.06         33.07          Peak           2         5360.00         46.23         -7.77         54.00         40.23         31.94         7.12         33.06          Peak           3         5360.00         59.11         -14.89         74.00         53.11         31.94         7.12         33.06          Peak	(	1000 4000.60	000.8000.										
Frequency (MHz)           Over         Limit         Read         Antenna         Cable         Preamp         A/Pos         T/Pos           Freq         Level         Limit         Line         Level         Factor         Loss         Factor         Remark           MHz         dBuV/m         dB         dBuV/m         dBuV/m         dBuV         dB/m         dB         cm         deg           1         5280.00         56.47         -11.73         68.20         50.57         31.91         7.06         33.07           Peak           2         5360.00         46.23         -7.77         54.00         40.23         31.94         7.12         33.06           Peak           3         5360.00         59.11         -14.89         74.00         53.11         31.94         7.12         33.06          Peak		1000 4000.00		12000	160	00 200	000	24000	28	000 3	32000	36000	40000
Freq         Level         Limit         Line         Level         Factor         Loss         Factor         Remark           MHz         dBuV/m         dB         dBuV/m         dBuV/m         dBuV         dB/m         dB         dB         cm         deg           1         5280.00         56.47         -11.73         68.20         50.57         31.91         7.06         33.07           Peak           2         5360.00         46.23         -7.77         54.00         40.23         31.94         7.12         33.06           Average           3         5360.00         59.11         -14.89         74.00         53.11         31.94         7.12         33.06           Peak													
MHz         dBuV/m         dB dBuV/m         dBuV         dB/m         dB         dB         cm         deg           1         5280.00         56.47         -11.73         68.20         50.57         31.91         7.06         33.07           Peak           2         5360.00         46.23         -7.77         54.00         40.23         31.94         7.12         33.06           Average           3         5360.00         59.11         -14.89         74.00         53.11         31.94         7.12         33.06           Peak											-	T/Pos	
MHz dBuV/m dB dBuV/m dBuV dB/m dB dB cm deg 1 5280.00 56.47 -11.73 68.20 50.57 31.91 7.06 33.07 Peak 2 5360.00 46.23 -7.77 54.00 40.23 31.94 7.12 33.06 Average 3 5360.00 59.11 -14.89 74.00 53.11 31.94 7.12 33.06 Peak		Fre	eq Leve	l Limit	Lin					Factor			Remark
1 5280.00 56.47 -11.73 68.20 50.57 31.91 7.06 33.07 Peak 2 5360.00 46.23 -7.77 54.00 40.23 31.94 7.12 33.06 Average 3 5360.00 59.11 -14.89 74.00 53.11 31.94 7.12 33.06 Peak		MH		m dB	dBuV					dB		deg	
2 5360.00 46.23 -7.77 54.00 40.23 31.94 7.12 33.06 Average 3 5360.00 59.11 -14.89 74.00 53.11 31.94 7.12 33.06 Peak	1					-							Peak
	2												
4 10400.00 55.03 -13.17 68.20 40.53 39.92 10.06 35.48 Peak	3												Peak
	4	10400.	.00 55.0	3 -13.17	68.	20 40.5	53 39	9.92	10.06	35.48			Peak
											vere de	tected.)	
ote 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)													
ote 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.) ote 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)												•	
	with th additio		lector me	ets the A	v-∟im	it so that	t the A	v lev	el does	s not ne	eea to t	be repo	iea in





Modulation Mod	11a				Test	Test Freq. (MHz)					5200			
Operating Mode		1					Polarization					V		
												Date: 201	4 02 40	
80	evel (dBuV/m)											Date. 201	4-02-19	
72.0	L∭UU─────							F <u></u>			П	FCCPA	RT15E	
64.0	3		1											
56.0	2							-	_		FC	CPART15	(AVG)	
48.0								-						
40.0								-						
32.0								-	_					
24.0								-						
16.0								-						
8.0								+						
0 <sup>1</sup> 10	000 4000.600	0.8000.	12000.	160	00.	20000	. 24	1000	. 280	) )00. 3	32000.	36000.	40000	
					F	requenc	y (MHz)							
			0ver									T/Pos		
	Free	Level	Limit	Lin						Factor			Remark	
	MHz	dBuV/m	dB	dBuV		dBuV				dB	сm	deg		
1		0 60.15											Peak	
2		0 49.68 -4.32											Average	
3		0 60.19											Peak	
4	10400.0	0 55.74	-12.46	68.	20	41.24	39.9	2	10.06	35.48			Peak	
Note 1: ">20dB" Note 2: "N/F" me Note 3: Measure Note 4: For restr with the	eans Nothinement rece	ng Found ive anten ls, the pe	spuriou na polar ak meas	s em izatio urem	issio on: F nent	ons (No I (Hori: is fully	o spur zontal suffic	iou: ), V ient	s emis: ' (Vertio t, as th	sions w cal) e max f	ere de field st	rength a	as meas	





Modulation N	od	е		1	1a					Tes	t Fre	q. (M	MHz)		5240		
Operating Mo	de			1						Pola	ariza	tion			Н		
																Data: 001	1 02 10
8		el (di	BuV/n	n)												Date: 201	4-02-19
72.	┢╋╋		Τ.			-			Ŀſ		┶╴	υL				FCCPA	RT15E
64.			4		_	-											
56.	⊫⊨		Ħ	-		5					-	-			FCO	PART15	e (AVG)
48.					_	+											
40.				-		++-											
32.	D					++-											
24.																	
16.	<b>0</b>				_	++-									_		_
8.											_						
		0 40	00.60	00.9	2000	Ш,	12000.	160	000.	20000		24000	) 28	000. 3	32000.	36000.	40000
		10 40	00.00				12000.			requenc			. 20		2000.		40000
							0ver	Lir	nit	Read	Ante	enna	Cable	Preamp	A/Pos	T/Pos	
			Fre	eq.	Leve	1	Limit	Lir	ne	Level	Fact	tor	Loss	Factor			Remark
		-	MHz		dBuV/		dB			dBuV	dB,		dB	dB	cm	deg	A
	L 2						-7.86 -16.64			40.15		.94 .94		33.06 33.06			Averag Peak
	2						-7.60			40.35		.94		33.06			Averag
	1						-14.76			53.19				33.06			Peak
1	5						-13.24										Peak
lote 1: ">20d																	
lote 2: "N/F" I															ere de	tected.)	
lote 3: Measu							•			•			•	,	e		
lote 4: For re		cted	ban	ds,	the p	eal	k meas	uren	nent	is fully	suff	Icien	t, as th	e max i	rield sti	rength a	as meas
الا حالة	~ ~	0001-	D	ha at		<b>^+</b> ~	+hc ^1	11:00	14	+ + + +	۰ <b>۵</b>	1100	مامامد	. not	ad + a !	oe repo	rtod in



Modulation M	ode	•		11a					Tes	t Fr	eq. (I	MHz)		5	5240		
Operating Mo	de			1					Pol	ariz	ation			١	/		
80	Lev	el (dBu	V/m)													Date: 201	4-02-19
72.0		╟║╧┲								┶	┅					FCCPA	RT15E
64.0			2		-												
56.0	╞╪		Ŧ		5					_	_	_			FCC	PART15	e (AVG)
48.0	$\vdash$		╉		+												
40.0	$\vdash$																
32.0	$\vdash$																
24.0	$\vdash$		+		+												
16.0	$\vdash$		+		+												
8.0	$\vdash$		+		+												
0	100	0 4000	0.600	0.8000.	1	2000.	160	000.	2000	).	24000	0. 29	000.	32	000.	36000.	40000
		0 4000		0.0000.		2000.			Frequen			0. 20		52			40000
						0ver	Lir	nit	Read	Ant	tenna	Cable	Prea	mp	A/Pos	T/Pos	
		F	req	Leve	1	Limit	Lir	ne	Level	Fac	tor	Loss	Fact	or			Remark
			1Hz	dBuV/		dB			dBuV		3/m	dB	dB		cm	deg	
1				0 46.0									33.0				Average Peak
				0 48.2									33.0				Average
4				0 57.2													Peak
5				0 55.6													Peak
Note 1: ">20dE	}" m	leans	sni	urious e	mis	sion l	avela	tha	t exce	tt he	ne lev	el of 2	0 dR	helr	w the	applic	able lim
Note 2: "N/F" n																	
Note 3: Measu														we			,
Note 4: For res														x fi	eld sti	renath :	as meas
				ctor me													
additio																	



Modulation M	ode	•	١	/HT20			Tes	t Freq	. (MHz)		5180		
Operating Mo	de		1				Pola	arizatio	on		Н		
	Lev	el (dBuV/ı	n)									Date: 201	14-02-19
80 72.0			Ĺ		<u> </u>							rcelp	ART15E
64.0												ruge	ARTISE
56.0		2		4							FC	C PART15	E (AVG)
48.0		- 1	-										
40.0													
32.0			+										
24.0			+										
16.0													
8.0													
· · · ·	100	0 4000.6	000.	8000.	12000.	16000.	20000 Frequenc		000. 2	28000.	32000.	36000.	40000
					0ver	Limit	Read		na Cabl	e Prear	np A/Pos	s T/Pos	
		Fre	eq	Level	Limit				r Loss			.,	Remark
		MH		dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	 dB	сm	deg	
1				45.94			40.23			3 33.08			
2				56.57						3 33.08			Peak
3							53.46			1 33.07			Peak
4		10360	.00	54.62	-13.58	68.20	40.18	39.8	5 10.0	6 35.47	/		Peak
Note 1: ">20dE Note 2: "N/F" n Note 3: Measu Note 4: For res with the additio	nea rem stric e P	ns Noth nent rec ted bar	ning ceiv nds,	Found e anten the pea	spuriou na polai ak meas	s emiss rization: suremer	ions (No H (Hori	o spuri zontal) suffici	ous em , V (Ver ent, as	issions tical) the max	were de k field st	etected.	) as meas



	od	C		VHT20					Ies	st Fi	req. (	(MHz)			5180		
Operating Mo	de			1					Pol	ariz	atio	n			V		
	Ler	ol (dD-	V/mal													Date: 20	)14-02-1
80	Lev	el (dBu	v/m)													Date. 20	/14-02-1
72.0	╏╹╹┺┿	<b>₩₩</b>			+-					Ŧ	᠇᠇			þ		FCC	PART15E
64.0			2		4								_		-		FF (1) (0)
56.0					Ĩ.					-					FCI	- PARI 1	5E (AVG
48.0													_				
40.0										-				-			
32.0						_											
24.0										-							
16.0																	
8.0										-							
0	100	0 4000	.6000	. 8000.	1	2000.	160	000.	2000	0.	2400	00. 2	8000.	3	2000.	3600	0. 400
									Frequen	су (М	Hz)						
						0ver			Read							T/Po	
		F	req	Leve	1	Limit	Li	ne	Level				Fac	tor			Rema
			/Hz	dBuV/	 m	dB	dBul	//m	dBuV		 B/m			R	 ст	de	 T
1				) 46.1													5 Aver
2				58.0									3 33.				
3				0 60.5													Peak
4	ŀ	1036	50.00	9 55.4	1 -	12.79	68	.20	40.97	3	9.85	10.0	6 35.	47			Peak
Note 1: ">20dE	3" n	neans	spu	rious e	mis	sion l	evels	s tha	t exce	ed t	he le	vel of	20 dE	3 bel	ow the	e appli	icable
lote 2: "N/F" n	nea	ans No	othin	g Foun	d s	puriou	is en	nissi	ons (N	o sp	ourio	us em	issior				
lote 3: Measu																	
Note 4: For res	stric	cted b	ands	the n	eak	meas	uren	nent	ie fully	/ כוו	fficio	nt ac	tha m	av fi	iald et	ronath	as ma



Modulation	Mod	le		VH	IT20					Tes	st Fi	req.	(MHz)			5200		
Operating N	lode	)		1						Pol	ariz	atio	n			Н		
																	Dato: 20	14-02-19
	80	vel (dBi	uv/m	)													Date: 20	14-02-13
7	2.0		F:_			_					Ŧ	ЪΓ				Л	FCCP	ART15E
	4.0		3			4												-
	6.0					4					-					FCI	PART15	E (AVG)
	8.0		Ť															
4	0.0																	
3	2.0																	
2	4.0	+																
1	6.0																	
	8.0																	_
	0 10	00 400	0 600	0.80	00	12	000.	160	000.	2000	0	240	00	28000	<u> </u>	32000.	36000	. 4000
										requen								
						0	ver	Lir	nit	Read	An	tenn	a Cabi	le Pi	reamp	A/Pos	T/Pos	
			Free	9	Leve]	LL	imit	Lir	ne	Leve]	l Fa	ctor	Los	5 Fa	actor			Remark
		-																
	1		MHz				dB			dBuV 50.48		B/m 1 01				CM	deg	Peak
	2									40.35								
	3									53.24								'
	4									40.49								Peak
Note 1: ">20	dR"	mean	s sn	urio		niss	ion I	avela	tha	t exce	ed t	he le	vel of	20 0	IR he	low the	e annli	cable lir
Note 2: "N/F																		
																	iecieu.	,
	. HUI 🗖	I I GI II			սուել	ii ia	pula	ı∠aıı	on. I		12UL	ai),	v (ve	ruud	17			
							•		nont	ic full			ntiac	the	, mav	fiald of	ronath	as mor
Note 3: Mea Note 4: For r with	restri	icted b	band	ls, tł	he pe	akı	meas	suren			y su	fficie						
ote 4: For r with	restri the l	icted b	band	ls, tł	he pe	akı	meas	suren			y su	fficie						as mea orted in
ote 4: For r	restri the l	icted b	band	ls, tł	he pe	akı	meas	suren			y su	fficie						



Modulation M	lod	е		V	HT20					Tes	t Fr	eq. (	MHz)		5200		
Operating Mo	ode			1						Pola	ariza	ation			V		
	1 er	vel (dB	uV/m	a												Date: 201	4-02-19
8	0	vei (ub	uv/III														
72.			Γ		ᡀᡗ	-	TL	ШF			ŦF	ᠧ			Л	FCC P/	ART15E
64.			3			4										PART15	
56.			-			i					-				FU	- PARI 13	E (AVG)
48.																	
40.																	
32.																	
24.							1										
16.																	
8.																	
	<sup>0</sup> 100	00 400	0.60	00.8	3000.	12	000.	160	000.	20000	).	2400	0. 28	000.	32000.	36000.	40000
									I	Frequence	:y (MI	Hz)					
							)ver								p A/Pos	T/Pos	
			Fre	q	Leve]	. เ	.imit	Lir	ne				Loss	Facto	r		Remark
		-	MHz		dBuV/n		dB	dBul	//m	dBuV		 3/m		dB	 cm	deg	
	1	52			-				-			· · · ·	7.06				Peak
	2												7.12				-
	3												7.12				
	4	104	100.	00	55.41	1	2.79	68.	. 20	40.91	39	9.92	10.06	35.48			Peak
lote 1: ">20d	B" r	nean	is sr	Juri	ous en	nise	sion l	evels	tha	t excer	ed th	ne lev	el of 2	0 dB b	elow the	e applic	able lim
lote 2: "N/F"																	
ote 3: Meas																	/
lote 4: For re	stri	cted	band	ds,	the pe	ak	meas	suren	nent	is fully	∕ suf	ficier	nt, as th	ie max	field st	rength a	as meas
lote 4: For re																rength a	



Modulation M	ode	;		VHT20	)				Tes	Fred	q. (N	MHz)		5240		
Operating Mo	de			1					Pola	rizat	ion			Н		
	Low	ol (dD)	u)//m)												Date: 201	4-02-19
80		el (dBı	iv/iii)												Dutc. 201	
72.0	╏╹╹┻┿╜		F:		+-		ШF			T	ſ∟			Л	FCC P/	ART15E
64.0			4		5	_					+			TC.		
56.0					Ť						+			FC	: PART15	E (AVG)
48.0											+					
40.0											1					
32.0																
24.0																
16.0																
8.0											1					
(	100	0 400	0.600	0.8000.	1	2000.	160	000.	20000		4000	0. 28	000.	32000.	36000.	40000
									Frequenc							
			_			0ver									T/Pos	_
			Freq	Leve	21	Limit	Li	ne	Level	Fact	or	Loss	Factor	•		Remark
		-	MHz	dBuV	 /m	dB	dBul	//m	dBuV	dB/	 m	dB	dB	сm	deg	
1				0 46.2									33.06		_	Averag
2				0 56.9									33.06			Peak
3		54	00.0	0 46.4	9	-7.51	54	.00	40.44	31.	96		33.06			Averag
4	Ļ			0 59.3					53.27				33.06			Peak
5		104	80.0	0 55.0	)1 -	13.19	68	.20	40.38	40.	96	10.07	35.50			Peak
	nea rem stric	ns N nent i ted b	othii rece band	ng Four ive ante	id s enna eak	puriou a polar a meas	s en izati suren	nissi on: I nent	ons (No H (Hori ∷is fully	o spui zonta suffic	riou I), ∖ cien	is emis / (Verti it, as th	sions w cal) ie max	vere de field st	tected.)	) as meas



lodulation Mode	VHT20	Tes	t Freq. (MHz)	5240	
perating Mode	1	Pol	arization	V	
80 <mark>Level (dBuV/m</mark>	1)			Date: 20	14-02-19
72.0				FCCP	ART15E
64.0					
56.0	5			FCC PART15	ie (AVG)
48.0					
40.0					
32.0					
24.0					
16.0					
8.0					
0 <mark>1000 4000.60</mark>	00.8000. 12000.	16000. 2000	). <b>24000. 28000</b> .	32000. 36000	. 40000
		Frequence	cy (MHz)		
	0ver		Antenna Cable Prea		
Fre	eq Level Limit	Line Level	Factor Loss Factor	or	Remark
 MHz	dBuV/m dB	dBuV/m dBuV	dB/m dB dB	dog	
	00 46.47 -7.53	-			Average
	00 57.40 -16.60				
3 5400.	00 48.49 -5.51	54.00 42.44			Average
4 5400.	00 57.39 -16.61	74.00 51.34	31.96 7.15 33.0	6	Peak
5 10480.	00 55.38 -12.82	68.20 40.75	40.06 10.07 35.5	0	Peak
ote 1: ">20dB" means sp		avala that avaa	d the level of 20 dB	halow the appli	
ote 2: "N/F" means Noth ote 3: Measurement rece	ing Found spuriou	s emissions (N	o spurious emissions		



Modulation M	ode	•	1	VHT40			Те	st Fre	q. (N	/IHz)		5	5190			
Operating Mo	de		-	1			Ро	larizat	ion			ŀ	1			
	Leve	el (dBu\	//m)											Date: 20	14-02-1	9
80 72.0					n									Eccle	ART15E	
64.0					- LIL									rugr	ANTIJE	
56.0			24		;								FC	C PART1	5E (AVG)	
48.0			₿ _													-
40.0	$\vdash$					+										-
32.0						+									_	
24.0																1
16.0																1
8.0																1
(	100	0 4000.	6000.	8000.	12000.	1600	0. 2000 Frequen		4000 )	. 28	000.	32	000.	36000	. 400	00
					0ver	Limi	it Read			Cable	Prea	mp /	A/Pos	s T/Pos	;	
		F	req	Level	Limit	: Line	e Leve	l Fact	or	Loss	Fact	or			Remar	rk
			Hz	dBuV/m		dBuV/	/m dBuV	dB/	m	dB	dB		cm	deg	5	
1				47.24			00 41.5			6.93						age
2				57.42 45.23					86 94	6.93 7.11					Peak Avera	
4							0 49.9			7.11					Peak	age
5							40.3			10.06					Peak	
Note 1: ">20dE	3" m	eans	spui	rious em	nission I	evels t	that exce	ed the	e lev	el of 20	) dB	belo	w th	e appli	cable l	imit
Note 2: "N/F" n												we	re de	etected	.)	
Noto 2. Mooou							n: H (Ho									
Note 3. Measu	4	1		41												



Modulation N	lod	е		VHT40					Tes	t Fre	q. (I	MHz)		5190		
Operating Mo	ode			1					Pola	ariza	tion			V		
8		/el (dBu\	//m)												Date: 201	4-02-19
72.	0	╢╢╢┌┼┰╴				<u>-</u>		-							FCCP	RT15E
64.			2													
56.	0		4		5									FC	C PART15	e (AVG)
48.	0		8								_					
40.	0										_					
32.	0				-											
24.	0				-											
16.	0				-											
8.	0															
		00 4000.	6000	0.000	12	000.	160	000.	2000		24000	1 20	D <b>00.</b>	32000.	36000.	40000
	100	JU 4000.	0000		12	000.	100		Frequenc			20		52000.	50000.	40000
					0	ver	Lir	nit	Read	Ante	enna	Cable	Pream	A/Pos	5 T/Pos	
		F	req	Leve]								Loss				Remark
			Hz	dBuV/n		dB			dBuV			dB	dB			
	1			0 50.17									33.08			Average
	2 3			0 61.69 0 46.24									33.08 33.06			Peak Averag
	4			0 40.24 0 56.28									33.06			Peak
	5			0 54.80												Peak
lote 1: ">20d	R" r	neene	sni	irious en	nice	ion	مامرد	the	t avcad	d th	يرما د		) dR ba	alow th	e annlic	ahle lim
Note 1: >200																
Note 3: Measu														1010 UC		,
Note 4: For re														field st	renath	as meas
				ctor mee												
	n.	-					-								- F -	



Modulation M	od	е	Ţ	VHT40					Tes	t Fre	q. (I	MHz)		5230		
Operating Mo	de			1					Pola	ariza	tion			Н		
80	Lev	vel (dBuV	//m)												Date: 201	4-02-19
72.0		₩₽₽₽₽				<u>⊨</u> _∎_				╕┢╴				Π	FCCP	RT15E
64.0					_											
56.0			24		5					_				FC	C PART15	e (AVG)
48.0	$\vdash$		₿⊢								_					
40.0				_												
32.0											_					
24.0	$\vdash$				-											
16.0	$\vdash$															
8.0											_					
0	100	0 4000.	6000	8000	12	000.	160	000.	20000		24000	1 28	000.	32000.	36000.	40000
									Frequenc	-		. 20		020001		
					C	ver	Lin	nit	Read	Ante	enna	Cable	Preamp	A/Pos	s T/Pos	
		Fi	req	Level	. L	imit	Lir	ne	Level	Fact	tor	Loss	Factor	•		Remark
1			Hz a oo	dBuV/m 3 45.92		dB			dBuV			dB	dB			Avenag
1				56.73									33.08 33.08			Average Peak
3				45.37					39.38				33.06			Averag
4				56.23									33.06			Peak
5		10460	0.00	54.88	-1	3.32	68.	. 20	40.28	40	.03	10.07	35.50			Peak
Note 1: ">20dE	}" n	neans	sou	rious en	niss	ion le	avels	tha	t excer	d th	e lev	el of 20	) dB be	ow th	e applic	able lim
Note 2: "N/F" n																
Note 3: Measu																,
Note 4: For res														field st	rength	as meas
				ctor mee												
	n.														-	



Modulation M	od	е	١	VHT40					Tes	t Fre	eq. (I	MHz)		5230		
Operating Mo	de			1					Pola	ariza	ation			V		
80	Lev	vel (dBuV	//m)												Date: 201	4-02-19
72.0		<u>₩₽₽₽₽</u>				╞┓╟				┱┢					FCCP	RT15E
64.0			24		_					_						
56.0			4 		5						_			FC	C PART15	e (AVG)
48.0	$\vdash$		₿⊢		-											
40.0	$\vdash$				$\vdash$											
32.0	$\vdash$															
24.0	$\vdash$				-											
16.0	$\vdash$				$\vdash$											
8.0	$\vdash$				-											
C	100	0 4000.	6000	8000	12	000.	160	000.	20000		24000	1 20	DOO. :	32000.	36000.	40000
	100	4000.	0000.	0000.	12	000.	100		Frequenc			. 20		52000.	50000.	40000
					c	ver	Lin	nit	Read	Ant	enna	Cable	Preamp	A/Pos	T/Pos	
		Fi	req	Level								Loss			.,	Remark
			Ηz	dBuV/m		dB			dBuV		/m	dB	dB		deg	_
1				46.06									33.08			Average
2				57.19 46.09							.86		33.08 33.06			Peak
4				56.26									33.06			Average Peak
5				54.88												Peak
-																
							-									
Note 1: ">20dE																
lote 2: "N/F" n														ere de	tected.)	
Note 3: Measu														e		
Note 4: For res											icien					
with the			- 1 -	1 m m	4.0 1	L . ^	/ ! '	- 14								



Modulation M	od	е		Vŀ	HT80					Tes	st Fr	eq.	(MHz)	)		5	5210				
Operating Mo	de			1						Pol	ariz	atio	n			ŀ	1				
		ol (dB	u\//m															Date:	201	4-02-19	)
		el (dB	uviii																		
72.0			Γ			_	TL				╶╌							FC	d <mark>pa</mark>	RT15E	
64.0			24			5											FC		T15F	(AVG)	
56.0 48.0			3																	(110)	
40.0																					
32.0																					
24.0														_							
16.0														_						_	
8.0														-+							
C	100	0 400	0.600	0.8	000	120	000.	16	000.	2000	0	240	00	280	00	32	000.	36(	000.	4000	
			5.500							Frequen				200		52		000			
						0	ver	Li	mit	Read	An	tenn	a Cab	le	Prea	mp /	A/Pos	5 T/F	os		
			Free	1	Level	L	imit	Li	ne	Leve]	L Fa	ctor	Los	s	Fact	or				Remar	ĸ
		-	MHz		dBuV/m			d Dui	 V /m		 d	 B/m	dB		dB						
1					49.85		dB 4.15			dBuV 44.14		1.86			ав 33.0		сm		leg	Avera	ge
2										53.55					33.0					Peak	0-
3										40.48		1.94			33.0					Avera	ge
4										51.68					33.0					Peak	
5		104	120.0	00	54.91	-1	3.29	60	.20	40.37	5	9.96	10.	01	35.4	9			-	Peak	
Note 1: ">20dE																					mit.
Note 2: "N/F" n																we	re de	etecte	əd.)		
Note 3: Measu																, <b>1</b> :-	اما ما		4 km -		<b>.</b>
Note 4: For res																					
with the	5 E	look	Doto	oto	r moo	to th	<u>۱۸</u> مر	/_1 in	nit or	h that t	the /	<u>۱۱/۱۸</u>		000	not	000	d to	hore	no.	rtad in	



Modulatior	n Mo	de		١	/HT80	)				Tes	t Fi	req. (	(MHz)	)		5210			
Operating	Mod	е		1						Pol	ariz	atio	n			V			
	80	evel (	(dBuV	/m)													Date: 201	4-02-19	
	72.0		∎╓┼┲═		nnm		<u> </u>		1-1		-	70					FCCIP	RT15E	
	64.0					-													
	56.0			4		5										FC	C PART15	E (AVG)	
	48.0			3															
	40.0																		
	32.0																		
	24.0																		
	16.0	-																	
	8.0									+									
	0 <sup>L</sup>	000 4	4000.6	<b>6000.</b>	8000.	1	12000.	160	000.	2000	0.	2400	00.	2800	00. 3	32000.	36000.	40000	
										Frequen	cy (M	IHz)							
							0ver	Lir	nit	Read	An	tenn	a Cabi	le I	Preamp	A/Pos	T/Pos		
			Fr	req	Lev	e1	Limit								Factor	-	.,	Remark	
_			MH	lz	dBuV	/m	dB	dBu\	//m	dBuV	d	B/m	dB		dB	cm	deg		
	1		5150	0.00	52.	58	-1.42	54.	.00	46.87	3	1.86	6.9	93 3	33.08			Averag	
	2		5150	0.00	62.0	ð5 ·	-11.95	74.	.00	56.34	. 3	1.86	6.9	93 3	33.08			Peak	
	3									40.55					33.06			Averag	
	4									50.42								Peak	
	5	1	10420	9.00	54.	58 -	-13.52	68.	. 20	40.14	. 3	9.96	10.0	ð7 :	35.49			Peak	
Note 1: ">2	OdP.	me	ane	snur	ioue	mir	ssion I	مامريد	the	t even	+ he	helo		20	dR bo	low th	e annlie	ahlo lin	
Note 1. $>2$ Note 2: "N/I																			
																	iecieu.	,	
Note 3: Mea																fiold of	ronath	20 000	
Note 4: For																			
with	n the dition		1K-D6	elec		ets	une A	v-∟lſĭ	nt SO	Junati	ne	AV IE	verdo	Jes	not ne	eu to	be repo	neu m	
								-				-						-	



# 3.7 Frequency Stability

## 3.7.1 Frequency Stability Limit

	Frequency Stability Limit									
UNI	I Devices									
	In-band emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.									
LE-	LAN Devices									
$\square$	N/A									
IEE	IEEE Std. 802.11n-2009									
	The transmitter center frequency tolerance shall be $\pm$ 20 ppm maximum for the 5 GHz band and $\pm$ 25 ppm maximum for the 2.4 GHz band.									

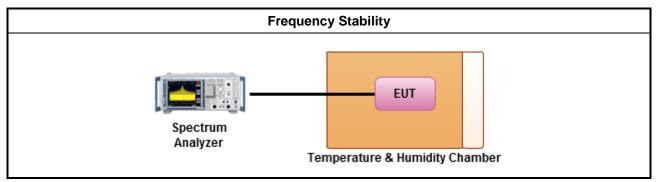
#### 3.7.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

#### 3.7.3 Test Procedures

	Test Method									
$\square$	Refer as ANSI C63.10, clause 6.8 for frequency stability tests									
	$\boxtimes$	Frequency stability with respect to ambient temperature								
	$\boxtimes$	Frequency stability when varying supply voltage								
$\square$	For	conducted measurement.								
	$\boxtimes$	For conducted measurements on devices with multiple transmit chains: Measurements need only to be performed on one of the active transmit chains (antenna outputs)								
		radiated measurement. The equipment to be measured and the test antenna shall be oriented to in the maximum emitted power level.								

## 3.7.4 Test Setup





	Г	Frequency Stability Result	
Мо	de	Frequency S	Stability (ppm)
Condition	Freq. (MHz)	Test Frequency (MHz)	Frequency Stability (ppm)
T <sub>20°C</sub> Vmax	5200	5200.01517	2.9173
$T_{20^{\circ}C}Vmin$	5200	5200.01325	2.5481
$T_{55^{\circ}C}Vnom$	5200	5200.01080	2.0769
$T_{50^{\circ}C}Vnom$	5200	5200.01359	2.6135
$T_{40^\circ C}$ Vnom	5200	5200.01101	2.1173
T <sub>30°C</sub> Vnom	5200	5200.01425	2.7404
$T_{20^\circ C}Vnom$	5200	5200.01869	3.5942
$T_{10^{\circ}C}Vnom$	5200	5200.01249	2.4019
T <sub>0°C</sub> Vnom	5200	5200.01561	3.0019
T <sub>-10°C</sub> Vnom	5200	5200.01654	3.1808
T <sub>-20°C</sub> Vnom	5200	5200.01149	2.2096
T <sub>-30°C</sub> Vnom	5200	5200.01130	2.1731
Limit (	ppm)		20
Res	ult	Con	nplied



# 4 Test Equipment and Calibration Data

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
EMC Receiver	R&S	ESCS 30	100132	9kHz ~ 2.75GHz	Nov. 14, 2013	Conduction (CO04-HY)
LISN	SCHWARZBECK MESS-ELEKTRO NIK	NSLK 8127	8127-477	9kHz ~ 30MHz	Jan. 21, 2014	Conduction (CO04-HY)
LISN (Support Unit)	EMCO	3810/2NM	9703-1839	9kHz ~ 30MHz	Apr. 18, 2013	Conduction (CO04-HY)
RF Cable-CON	HUBER+SUHNE R	RG213/U	07611832010001	9kHz ~ 30MHz	Oct. 30, 2013	Conduction (CO04-HY)
50 ohm terminal	N/A	N/A	CON-01-04	N/A	Feb. 25, 2014	Conduction (CO04-HY)

Note: Calibration Interval of instruments listed above is one year.

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Spectrum Analyzer	R&S	FSV40	101499	9Kz – 40GHz	Feb. 08, 2014	Radiation (03CH08-HY)
Receiver	R&S	ESR3	101657	9KHz – 3GHz	Jan. 18, 2014	Radiation (03CH08-HY)
Amplifier	Burgeon	BPA-530	100218	30MHz ~ 1000MHz	Dec. 09, 2013	Radiation (03CH08-HY)
Amplifier	Agilent	8449B	3008A02665	1GHz – 26.5 GHz	Sep. 04, 2013	Radiation (03CH08-HY)
Horn Antenna	ETS-LINDGREN	3117	66584	1GHz~18GHz	Aug. 07, 2013	Radiation (03CH08-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA 9170517	15GHz~40GHz	Dec. 27, 2013	Radiation (03CH08-HY)
Bilog Antenna	Teseq GmbH	CBL6112D	35379	30 MHz - 1 GHz	Oct. 10, 2013	Radiation (03CH08-HY)

Note: Calibration Interval of instruments listed above is one year.

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Amplifier	EM	EM18G40G	060572	26.5GHz ~ 40GHz	Jun. 20, 2013	Radiation (03CH08-HY)
Loop Antenna	R&S	HFH2-Z2	860004/0001	9 kHz - 30 MHz	Jul. 03, 2012	Radiation (03CH08-HY)

Note: Calibration Interval of instruments listed above is two year.



Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Spectrum Analyzer	R&S	FSV 40	101063	9KHz~40GHz	Feb. 17, 2014	Conducted (TH01-HY)
Spectrum Analyzer	Agilent	N9010A	MY53400091	9KHz~44GHz	Oct. 07, 2013	Conducted (TH01-HY)
Temp. and Humidity Chamber	Giant Force	GTH-225-20-SP- SD	MAA1112-007	-20 ~ 100℃	Nov. 21, 2013	Conducted (TH01-HY)
Signal Generator	R&S	SMB100A	175727	10MHz ~ 40GHz	Jan. 07, 2014	Conducted (TH01-HY)
Power Sensor	Anritsu	MA2411B	1207366	300MHz ~ 40GHz	Oct. 24, 2013	Conducted (TH01-HY)
Power Meter	Anritsu	ML2495A	1241002	300MHz ~ 40GHz	Oct. 24, 2013	Conducted (TH01-HY)
DC Power Source	G.W.	GPC-6030D	C671845	DC 1V ~ 60V	Jun. 21, 2013	Conducted (TH01-HY)
AC Power Source	G.W	APS-9102	EL920581	AC 0V ~ 300V	Jul. 16, 2013	Conducted (TH01-HY)

Note: Calibration Interval of instruments listed above is one year.